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Spiders of the Family Symphytognathidae from North and South America

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The spiders of the family Symphytognathidae are always minute, rarely exceeding 1.5 mm. in length, and are found in the leaf debris and moss of forested areas. From the meager information available it would seem that most of the species, if not all, construct orbwebs and are limited to habitats with a constant high humidity.

The present paper is based on a small series of these spiders in the collections of the American Museum of Natural History and represents only a small section of the fauna that will ultimately be recorded from Central and South America when particular efforts are made to collect these interesting spiders by the more extensive use of Berlese funnel techniques.

Eight species placed in five genera have been recorded previously from the Americas:

Anapis hetschkii (Keyserling) from south Brazil

Anapis keyserlingi Gertsch from Barro Colorado Island, Panama

Anapisona furtiva Gertsch from Barro Colorado Island, Panama

Anapisona hamigera (Simon) from Venezuela and St. Vincent, British West Indies

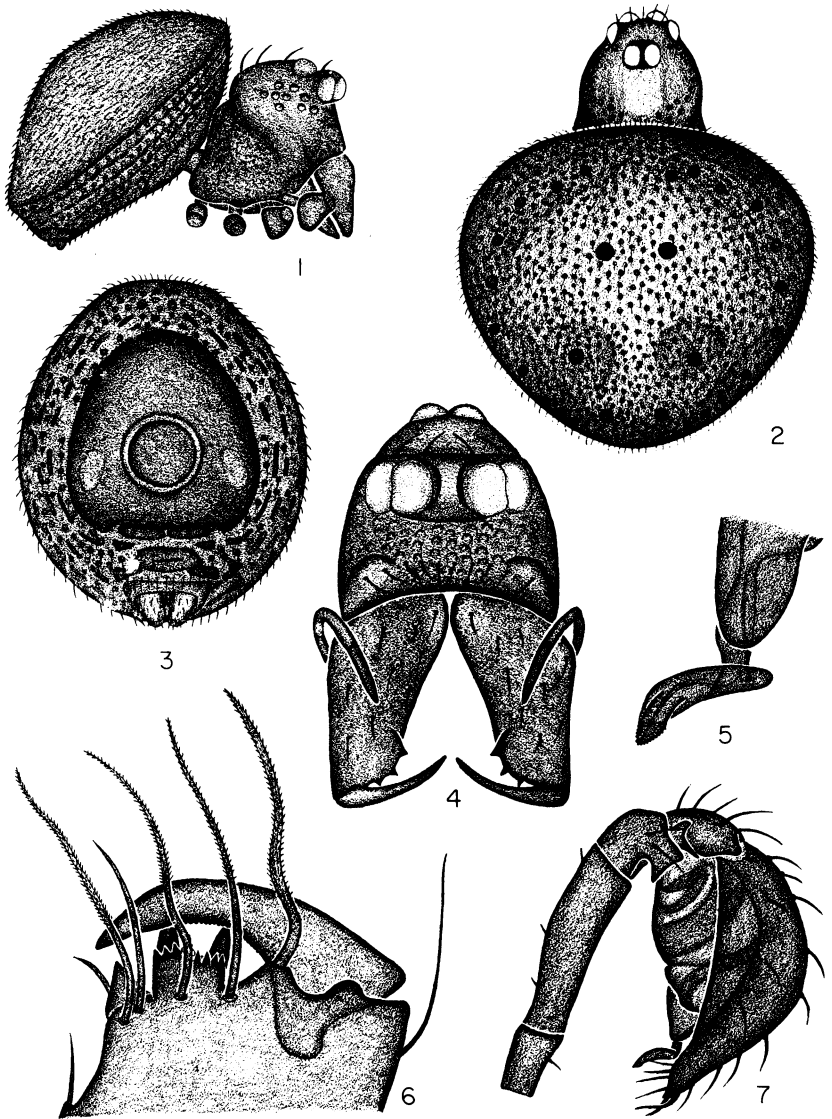
Anapisona simoni Gertsch from Barro Colorado Island, Panama

Anapistula secreta Gertsch from Barro Colorado Island, Panama

Epecthina circinata Simon from Venezuela

Epecthinula minutissima Simon from Jamaica, British West Indies

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FIGS. 1-7. *Anapis mexicana*, new species. 1. Body of male, side view. 2. Body of female, dorsal view. 3. Abdomen of male, ventral view. 4. Head of female, front view. 5. Embolus of male palp, retrolateral view. 6. Chelicera of male, prolateral view. 7. Male palp, retrolateral view.

Four additional species are described in the present paper, three from Mexico and one from British Guiana.

Where sufficient material has been available, the respiratory system has been examined. *Anapisona simoni* Gertsch and *A. gertschi*, new species, were found to possess two sets of tracheae. The anterior spiracles are situated at the posterolateral margins of the ventral scute and open into atria which are connected by a transverse duct. From each atrium numerous tracheae ramify throughout the abdomen. The posterior median spiracle is situated at the base of the spinnerets and opens into a short atrium from which two pairs of tracheal trunks are directed forward. The two inner trunks pass through the petiolus into the cephalothorax, where they are broken up into numerous fine tracheae. The outer pair is limited to the abdomen. *Anapis mexicana*, new species, has a similar system, but the posterior tracheae open from a plate situated midway between the posterior margin of the ventral scute and the spinnerets. An undescribed, eight-eyed symphytognathid from the west coast of the United States differs considerably from this pattern. The posterior tracheae are absent, while the anterior spiracles, which in this species are situated in front of the posterior margin of the ventral scute, open into small atria from which originate numerous tracheae apparently limited to the abdomen. The transverse duct, present in all other American species examined, is absent. An incomplete examination of a female *Anapistula secreta* from Mexico indicates that the anterior tracheal system is similar to that found in *Anapisona*, but the presence or absence of posterior tracheae is still in doubt.

It is of interest to record that the respiratory system of *Lucarachne palpalis* Krauss, which is at present placed in the Theridiosomatinae, is similar to that found in *Anapisona*.

My thanks are due to Dr. Willis J. Gertsch for the privilege of examining and reporting on the material in the American Museum collections and also for many helpful suggestions and discussions throughout the preparation of the paper. I also wish to acknowledge with pleasure assistance from the Council Fund, which made my stay at the American Museum of Natural History possible.

ANAPIS SIMON

Anapis mexicana, new species

Figures 1-7, 25

MALE: Total length, 1.30 mm. Carapace, 0.65 mm. long, 0.45 mm. wide, 0.39 mm. high. Abdomen, 0.78 mm. long, 0.71 mm. wide.

Carapace and sternum uniform dark reddish brown, with faint black

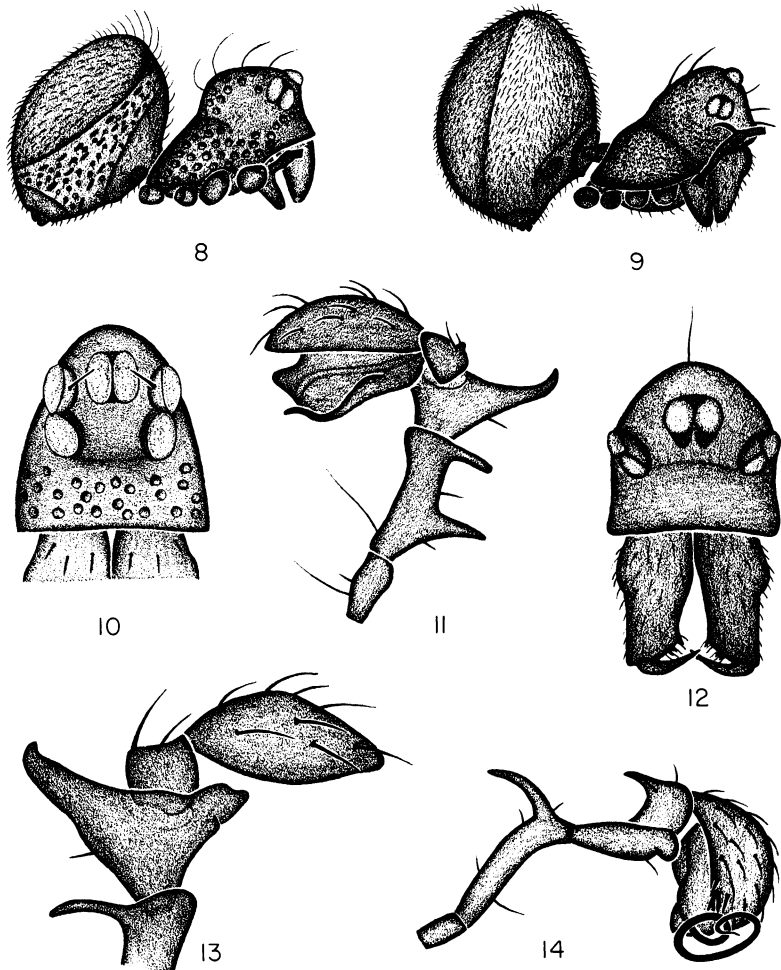


FIG. 8. *Anapisona gertschi*, new species, body of male, side view.

FIG. 9. *Anapisona kartabo*, new species, body of male, side view.

FIGS. 10, 11. *Anapisona gertschi*, new species. 10. Head of male, front view.
11. Male palp, prolateral view.

FIG. 12. *Anapisona kartabo*, new species. Head of male, front view.

FIG. 13. *Anapisona gertschi*, new species. Male palp, retrolateral view.

FIG. 14. *Anapisona kartabo*, new species. Male palp, retrolateral view.

markings on the dorsal surface of the head and about the eyes. Eyes pale. Dorsal and ventral scutes of abdomen and spinneret ring reddish brown. Non-sclerotized portions of the abdomen pale yellow-brown. Appendages yellow-brown, paler than carapace.

Carapace longer than wide in ratio of 13:9, narrowing anteriorly.

Head highest in the eye region, where height of carapace is equal to length. Cephalic groove shallow, thorax sloping steeply down behind to petiolus, lateral surfaces slightly swollen to form low shoulders. Lateral surfaces of head and clypeus finely granulate; few punctures on upper sides of head, and the dorsal surface smooth. Clypeus vertical, almost three times as high as width of an anterior lateral eye. Carapace joined to sternum by sclerotized strips which pass between the coxae and with an additional strip separating chelicerae and maxillae.

Six eyes, large, situated in three contiguous pairs. Ratio of eyes: Anterior lateral eyes: posterior median eyes: posterior lateral eyes, 14:10:11. From above the posterior row is strongly procurved. Posterior median eye separated from posterior lateral eye by eight-tenths of the diameter of the former. The anterior lateral eyes separated from each other by about one-third of their diameter.

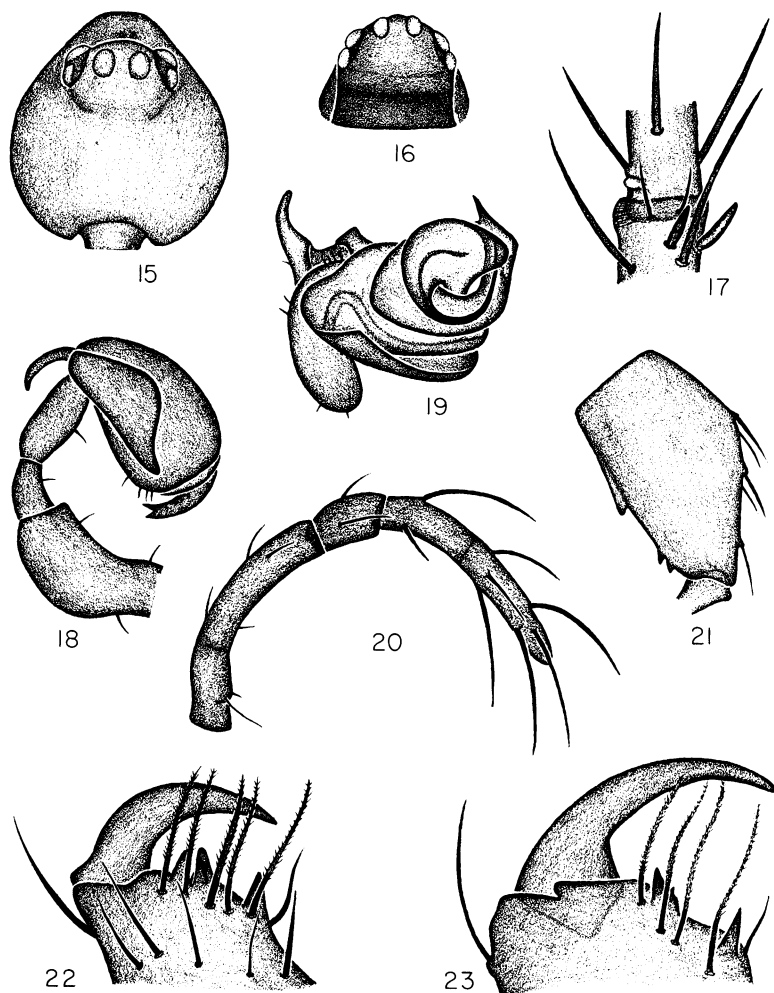
Sternum convex, coarsely punctate, longer than wide in ratio of 11:9, broadly truncate behind where the fourth coxae are separated by twice their width. Labium fused to sternum, as wide as long, the anterior margin truncate, the area behind margin excavated. When viewed from below, maxillae appear L-shaped, with the distal arm at right angle to the median axis of the body. A well-developed serrula present along the anterior margin.

Chelicerae vertical, stout, the proximodorsal surface distended. Retromargin with three teeth; promargin with a broad flattened process bearing an apical row of eight denticles. Single row of four long, setose hairs behind the promargin and a few scattered smooth hairs elsewhere.

Legs clothed with fine, smooth hairs, without true spines, with a strong bristle on distodorsal surfaces of patellae and tibiae. Leg formula, 1243.

	I	II	III	IV
Femur	0.39 mm.	0.34 mm.	0.29 mm.	0.33 mm.
Patella	0.17	0.13	0.08	0.13
Tibia	0.34	0.26	0.20	0.23
Metatarsus	0.17	0.13	0.09	0.13
Tarsus	0.36	0.33	0.26	0.28
Total	1.43 mm.	1.19 mm.	0.92 mm.	1.10 mm.

Tarsal drum present on proximal surface of all tarsi. Three claws on all tarsi; superior claws on first leg appear to be armed with a single mid-ventral denticle, but claws of remaining legs smooth. Two accessory hairs on each tarsus, serrated ventrally. Three trichobothria in



FIGS. 15, 16. *Anapistula boneti*, new species. 15. Carapace of male, dorsal view. 16. Head of male, front view.

FIG. 17. *Anapisona kartabo*, new species, first leg, distal portion of metatarsus, proximal portion of tarsus showing ventral thorns and tarsal drum.

FIGS. 18, 19. *Anapistula boneti*, new species. 18. Male palp, retrolateral view. 19. Male palp, prolateral view.

FIG. 20. *Anapisona gertschi*, new species, palp of female.

FIG. 21. *Anapisona boneti*, new species, chelicera of male.

FIG. 22. *Anapisona kartabo*, new species, chelicera of male.

FIG. 23. *Anapisona gertschi*, new species, chelicera of male.

single row along proximal two-thirds of the tibia of each leg and a single median trichobothrium on the middle surface of the metatarsi of first, second, and third legs. Metatarsus of fourth leg without trichobothria.

Palp as illustrated in figure 6. Apophyses on retrolateral surfaces of patella and tibia. Patellar process distal, broad, clavate, tibial process transverse at one-third of the length of segment. Cymbium not modified. Embolus twisted as shown in figure 7. Trichobothria absent.

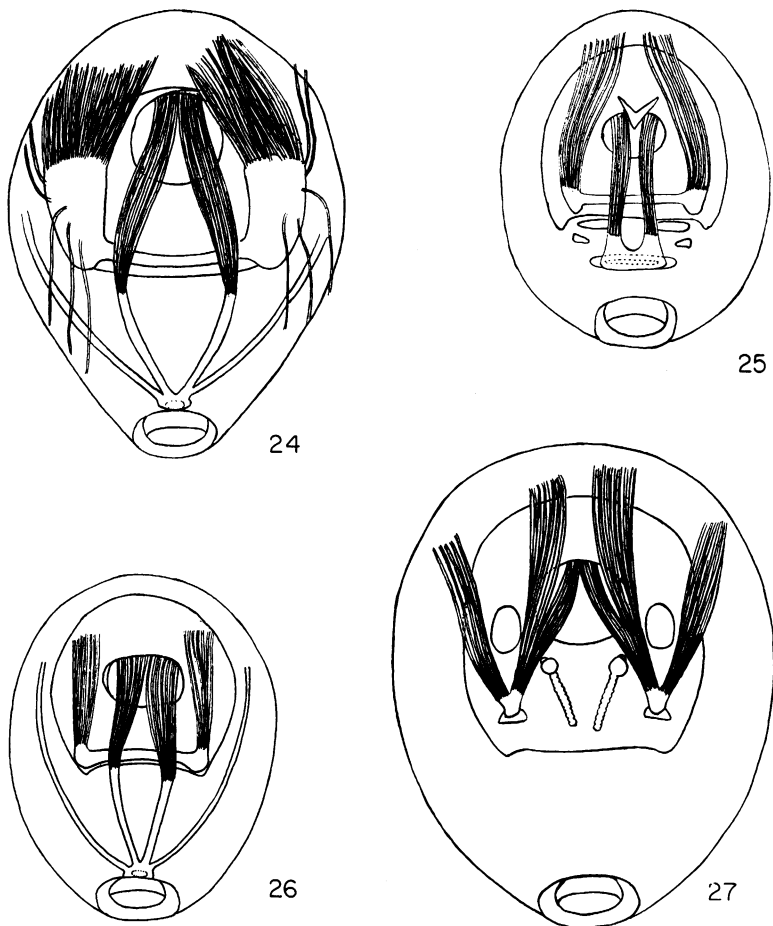
Abdomen slightly longer than wide. Smooth dorsal scute covers most of the dorsal surface. Ventral scute encircles petiolus and extends dorsally. Anterior spiracles open externally at the inner margin of the posterolateral notch of ventral scute. The posterior spiracle transverse and narrow, opening from a plate situated midway between spinnerets and posterior margin of ventral scute. The anterior spiracles open into an atrium, from which three tracheal tubes ramify through the abdomen. Atria joined proximally by a transverse tube. Posterior spiracle opening into a broad atrium from which two trunks are directed forward, where they are divided into numerous small tracheae, most of which extend into the cephalothorax. Portions of abdomen not covered by scutes with alternate rows of irregularly shaped, non-setose sclerites and more rounded setose sclerites. Six spinnerets and colulus surrounded by sclerotic ring.

FEMALE: Total length, 1.82 mm. Carapace, 0.78 mm. long, 0.52 mm. wide, 0.51 mm. high. Abdomen, 1.24 mm. long, 1.23 mm. wide.

Close to the male in general appearance and structure. Abdomen much broader, lacking dorsal scute (fig. 2), closely covered with small, setose sclerites and with a lateral row of larger, non-setose sclerites and three median pairs. Epigynum similar to that figured for *A. keyserlingi* (Gertsch, 1941, Amer. Mus. Novitates, no. 1146, fig. 13), but receptacle curving anteriorly. Palp small, lacking claw, but segments not reduced in number. Single trichobothrium on tibia at one-third. Legs 1243.

	I	II	III	IV
Femur	0.45 mm.	0.39 mm.	0.32 mm.	0.39 mm.
Patella	0.13	0.16	0.13	0.13
Tibia	0.36	0.28	0.26	0.32
Metatarsus	0.17	0.14	0.14	0.16
Tarsus	0.39	0.36	0.29	0.31
	<hr/>	<hr/>	<hr/>	<hr/>
Total	1.50 mm.	1.33 mm.	1.14 mm.	1.31 mm.

TYPE LOCALITY: Baños de Sulfre, near Teapa, Tabasco, Mexico, male holotype taken August 1, 1948 by C. and M. Goodnight.



FIGS. 24-27. Tracheal system viewed from above. 24. *Anapisona simoni* Gertsch. 25. *Anapis mexicana*, new species. 26. *Anapisona gertschi*, new species. 27. An undescribed symphytognathid from west coast of United States.

OTHER LOCALITIES: *Chiapas*: Monte Liban, 20 kilometers east of El Real, July 4-5, 1950 (C. and M. Goodnight and L. J. Stannard), female allotype. *Veracruz*: Banana grove, Rio Metlae, El Fortin, December 15, 1948 (Hugh B. Leech), male paratype.

This species is closely related to *Anapis keyserlingi* Gertsch from Barro Colorado Island. It may be separated from it by the smaller size, the smaller distance between the anterior lateral eyes, which are separated by the diameter of an anterior median eye in *A. keyserlingi* and only one-third of this distance in *A. mexicana*, and differences in the female epigynum.

ANAPISONA GERTSCH*Anapisona gertschi*, new species

Figures 8, 10-11, 13, 20, 23, 26

MALE: Total length, 0.87 mm. Carapace, 0.45 mm. long, 0.35 mm. wide, 0.35 mm. high. Abdomen, 0.58 mm. long, 0.39 mm. wide.

Cephalothorax and appendages uniform yellow-brown. Eyes pale, ringed with black. Abdominal scutes yellow-brown, soft portions pale creamy yellow.

Carapace narrowing in front, as wide as long. Cephalic groove shallow. Thorax with slight lateral shoulders, sloping steeply behind to the petiolus. Head rising steeply from the groove to maximum height which is approximately one-half of the length. Thorax coarsely punctate but tending to be granulate behind. Punctations extend along the lateral surfaces of the head and over the clypeus. Few punctures on the upper lateral margins of the head, but dorsal surface smooth, flattened, with two pairs of relatively long hairs. Clypeus vertical, height equal to one and one-third times the diameter of an anterior lateral eye.

Six subequal eyes in three contiguous pairs. Posterior median eye separated from the posterior lateral eye by four-fifths of the diameter of the former. Anterior lateral eyes separated from each other by one and a half times their width. Posterior row of eyes gently recurved, when viewed from above.

Sternum convex, coarsely punctate, longer than wide in ratio of 8:7, joined to carapace by strips, which pass between the coxae, and an additional strip separating the chelicerae and maxillae. Posterior margin of the sternum truncate, separating fourth pair of coxae by distance equal to one and a half times their width. Maxillae bent across labium, terminated sharply. Labium fused, almost twice as wide as long.

Chelicerae vertical, with a strong tooth on the proximal margin of the furrow and another tooth at the middle of the promargin which bears two small denticles on the anterior slope. Row of seven ciliated hairs above the promargin and scattered smooth hairs elsewhere.

Palp as illustrated in figures 12 and 13. Femur with two stout dorsal apophyses. Patella produced dorsally into a strong spinose process. Embolus short, straight, without conductor.

Legs clothed with smooth hairs. First leg without spinose processes, but with distal region of tibia and proximal region of tarsus slightly bent. Strong bristle present on dorsal surface of each patella at distal end. Leg formula, 4123.

	I	II	III	IV
Femur	0.32 mm. ,	0.29 mm.	0.26 mm.	0.32 mm.
Patella	0.11	0.10	0.10	0.10
Tibia	0.27	0.23	0.19	0.29
Metatarsus	0.12	0.12	0.11	0.12
Tarsus	0.26	0.24	0.22	0.26
Total	1.08 mm.	0.96 mm.	0.88 mm.	1.09 mm.

Tarsal drum at one-fifth of length of segment. First three legs with three (2:1) trichobothria on proximal half of tibia and a single median trichobothrium on the metatarsus. Fourth leg with four (1:2:1) trichobothria on proximal half of tibia and none on the metatarsus. Three claws present, the superior with a single, small, median denticle on first two pairs of legs. Two serrated accessory hairs on all tarsi.

Abdomen with both dorsal and ventral scutes. Dorsal scute smooth, clothed with numerous short hairs. Ventral scute encircling the petiolus and extending dorsally to near the dorsal scute and posteriorly to midway between the petiolus and spinnerets. The anterior spiracles open at the posterolateral notches of the scute into a small atrium which becomes part of the transverse connecting tube. From both outer limits of the atria originates a bunch of small tracheal tubes. There is a single posterior median spiracle at the base of the spinnerets opening into a small atrium, from which four large tracheal tubes open anteriorly. The outer pair does not branch and is limited to the abdomen; the inner pair is branched and appears to extend into the cephalothorax.

Soft portions of the abdomen with longitudinal rows of small sclerotic plates. Six spinnerets present; colulus enclosed in a sclerotic ring.

Both available females lack abdomens. Carapace as in male but posterior median eyes smaller, only one-half of the diameter of the lateral eyes. Promarginal tooth of the chelicerae evenly trifid. Palp small, 0.23 mm. long. Trochanter-femur and femur-tibia joints completely fused and distinguished only by transverse grooves (fig. 20). Claw absent. Leg formula, 4123.

	I	II	III	IV
Femur	0.34 mm.	0.29 mm.	0.22 mm.	0.32 mm.
Patella	0.10	0.09	0.08	0.10
Tibia	0.22	0.20	0.18	0.26
Metatarsus	0.13	0.12	0.12	0.13
Tarsus	0.26	0.25	0.19	0.26
Total	1.05 mm.	0.95 mm.	0.79 mm.	1.07 mm.

TYPE LOCALITY: Tenejapa, Chiapas, Mexico, July 22, 1950, C. Goodnight, male holotype.

OTHER LOCALITY: *Chiapas*: Palenque Ruins, July 6, 1949 (C. J. Goodnight), female allotype and male and female paratypes.

The structure of the male palp of this species clearly separates it from the two previously known species, *A. simoni* and *A. furtiva* from Panama, as well as from the second species recorded in this paper, *A. kartabo*, from British Guiana.

Anapisona kartabo, new species

Figures 9-10, 12, 14, 17, 22

MALE: Total length, 1.04 mm. Carapace, 0.45 mm. long, 0.30 mm. wide, 0.30 mm. high. Abdomen, 0.73 mm. long, 0.53 mm. wide.

Cephalothorax reddish brown, legs paler yellow-brown. Abdomen pale yellow, scutes only slightly darker.

Carapace narrowing anteriorly. Cephalic groove shallow. Head evenly rounded, highest near midpoint where height is equal to the width of the carapace. Thorax with slight lateral shoulders; posterior slope steep. Thorax and posterior surface of head finely granulate. Clypeus vertical; height equal to one and one-half times the diameter of an anterior lateral eye.

Six eyes, relatively large, subequal in size. Lateral eyes contiguous, placed on a definite tubercle. Posterior median eyes contiguous. When viewed from above the posterior row is gently recurved. Posterior median eye separated from posterior lateral eye by slightly more than the diameter of the former. A ridge extends between the anterior lateral eyes overhanging the clypeus.

Sternum weakly convex, finely granulate, cordiform, longer than wide in ratio of 5:4, broadly rounded behind, separating coxae of the fourth pair of legs by twice their width. Labium fused to sternum, twice as wide as long, anterior margin evenly rounded, excavated behind the margin. Maxillae when viewed from below L-shaped as in *A. mexicana*, with the anterior arm at right angle to the median axis of the body.

Chelicerae vertical, proximodorsal surface swollen and with a small, proximoventral lobe. Promargin with three strong teeth, retromargin with a single tooth. A row of five strong, ciliate hairs above the promargin and scattered smooth hairs elsewhere.

Palp as illustrated in figure 16. Aphophyses present on femur and tibia. Cymbium with four strong bristles on the sub-distal retrolateral margin. Slender, coiled embolus situated distally; embolus absent.

Legs clothed with smooth hairs. First leg with four short, stout,

articulated thorns on the ventral surfaces as follows: tibia with a single median, metatarsus with one median and two distal. Tarsal drum present at the base of all tarsi. Leg formula, 1243.

	I	II	III	IV
Femur	0.59 mm.	0.39 mm.	0.26 mm.	0.32 mm.
Patella	0.19	0.16	0.13	0.13
Tibia	0.45	0.32	0.19	0.26
Metatarsus	0.20	0.17	0.13	0.14
Tarsus	0.32	0.26	0.20	0.20
Total	1.75 mm.	1.30 mm.	0.88 mm.	1.05 mm.

A single row of three trichobothria present on proximal half of the tibiae of all legs and a single median trichobothrium on metatarsi of first, second, and third legs. Three claws; all appear to have a single ventral tooth.

Abdomen clothed with numerous short hairs. Dorsal scute smooth, covering most of the dorsal surface. Ventral scute small, extending back two-fifths of the distance between the petiolus and spinnerets. Spiracles are visible at the posterolateral margins of the scute, but no posterior spiracle has been observed. The tracheal system of this species has not been examined. The soft portions of the abdomen lack the sclerotic plates typical of other known species in this genus. Six spinnerets present; and colulus enclosed by sclerotic ring.

TYPE LOCALITY: Kartabo, British Guiana, 1924, male holotype, taken by sifting.

In the structure of the male palp this species resembles *Anapis simoni* and *A. furtiva* of Panama but is clearly distinct from both.

ANAPISTULA GERTSCH

Anapistula GERTSCH, 1941, Amer. Mus. Novitates, no. 1146, p. 2.

GENOTYPE: *Anapistula secreta* Gertsch.

This genus was established for a four-eyed spider from Barro Colorado Island, Panama. The Mexican species described below possesses six eyes, the posterior median eyes being present and equal in size to the lateral eyes. This species is undoubtedly closely related to the type species, and, in view of the considerable range in number of eyes throughout the Symphytognathidae, I have not considered the presence of the posterior median eyes to be of sufficient importance to justify the establishment of a separate genus at this time.

It is of interest to record the presence of typical *Anapistula* from Australia (personal collection) and Angola, East Africa (Machado, in litt.).

Anapistula secreta Gertsch

Anapistula secreta GERTSCH, 1941, Amer. Mus. Novitates, no. 1146, p. 2.

This species was established for a single female found on Barro Colorado Island, Panama. In the collection studied are four additional females from two localities in Mexico and from South Bimini in the Bahama Islands, which appear to be identical with the holotype. One of these specimens was prepared for study by sodium hydroxide treatment, but unfortunately was destroyed before it was fully examined. However, it is evident that two spiracles near the outer limits of the epigynal groove open internally into short atria which are connected by a transverse tube. From these atria several tracheae, probably four or five in number, ramify throughout the abdomen. It is possible that a posterior tracheal system is also present, although this was not observed.

NEW LOCALITIES: *Chiapas*: Finca El Real, Ocosingo Valley, June 25, July 1-7, 1950 (C. and M. Goodnight and L. Stannard), three females. *Colima*: Manzanillo, January 15, 1945 (F. Bonet), female. *Bahama Islands*: South Bimini, March 22-28, 1953 (A. M. Nadler), female.

Anapistula boneti, new species

Figures 15-16, 18-19, 21

MALE: Total length, 0.68 mm. Carapace, 0.33 mm. long, 0.33 mm. wide, 0.20 mm. high. Abdomen, 0.44 mm. long, 0.32 mm. wide.

Color of the entire spider pale yellowish brown.

Carapace smooth, as wide as long, narrowing anteriorly, the cephalic groove absent. When viewed from the side, the carapace rises evenly from the posterior margin to the eye region, where the height is equal to approximately two-thirds of the length of the carapace. The clypeus projects down and forward over the base of the chelicerae and is somewhat convex, equal in height to four times the diameter of an anterior lateral eye.

Six eyes present, subequal in size. Lateral eyes contiguous, on a low tubercle. Posterior median eyes separated from each other and from the posteral lateral eyes by a distance equal to the diameter of the former. Posterior row gently recurved as seen from above.

Sternum scutiform, slightly longer than wide, smooth, slightly convex, truncate behind, where the coxae of the fourth pair of legs are separated by twice their diameter. Sternum and carapace not connected by sclerotic strips between coxae. Labium fused, twice as wide as long. Maxillae directed across the labium, broadly rounded distally.

Chelicerae short, vertical, and apparently fused to each other proxi-

mally. There are two small teeth near the base of the fan; elsewhere a few smooth hairs, and ciliated hairs lacking.

Palp as illustrated in figures 22-23. Apophyses absent. Cymbium with a spinose process on the posterior surface which is excavated below. There is a prominent spatulate paracymbium present. Embolus slender, curved, with a stout conductor which is distally bifid.

Legs clothed with smooth hairs. Tarsal drum at base of each tarsus. Leg formula, 1241.

	I	II	III	IV
Femur	0.45 mm.	0.45 mm.	0.32 mm.	0.35 mm.
Patella	0.10	0.09	0.09	0.11
Tibia	0.39	0.32	0.21	0.26
Metatarsus	0.18	0.16	0.13	0.14
Tarsus	0.32	0.29	0.25	0.26
Total	1.44 mm.	1.31 mm.	1.00 mm.	1.11 mm.

First three pairs of legs with a row of three trichobothria on the proximal half of the tibia and a single median trichobothrium on the metatarsus. Fourth leg with a row of four on the proximal half of the tibia and none on metatarsus. Three smooth claws, with two ventral accessory hairs.

Abdomen soft, without scutes, sparsely clothed with relatively long hairs. Six spinnerets and small colulus present. The abdomen of the single specimen available for study is shriveled, and the spiracles have not been observed.

TYPE LOCALITY: Atoyac, Veracruz, Mexico, November 12, 1941, F. Bonet, male holotype.

OTHER LOCALITY: *Chiapas*: Finca El Real, Ocosingo Valley, July 10, 1950 (C. and M. Goodnight and L. Stannard), two damaged immature males.

This species is immediately separable from the single species previously described, *A. secreta* from Panama, by the possession of six eyes instead of four.